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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,302	09/22/2005	Michihiro Ohnishi	09947.0002-00000	1171

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FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER
LLP
901 NEW YORK AVENUE, NW
WASHINGTON, DC 20001-4413

EXAMINER

FORMAN, BETTY J

ART UNIT	PAPER NUMBER
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1634

MAIL DATE	DELIVERY MODE
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01/04/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/550,302

Applicant(s)

OHNISHI ET AL

Examiner

BJ Forman

Art Unit

1634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Objections

1. Claims 5-13 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from another multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claims 5-13 are not fully treated on the merits.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 10-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 10-13 are indefinite in Claim 10 for the recitation "the microchip having the surface hydroxyl groups on the inner wall". The recitation lacks proper antecedent basis in the claims because the preceding claims do not define a wall having hydroxyl groups. It is suggested the claim be amended to properly depend from Claim 8.

Claim 11 is indefinite for the recitation "including trialkyl.....as a main component". The recitation is indefinite because unclear whether the surface or the surface treatment comprises the trialkyl halogensilane. As such, it is unclear whether trialkyl halogensilane is a component of the surface.

Claims 12 and 13 are each indefinite because the claims are drawn to methods for extracting nucleic acids, but the claims do not have any steps, and especially do not have steps resulting in extracted nucleic acids.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-2, 6-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Sato et al (Electrophoresis, 2002, 23: 734-739).

Regarding Claim 1, Sato et al disclose a microchip having a microchannel formed by grooved connecting surfaces of upper and lower substrate (§ 2.2), wherein the microchannel is provided with a gap in which a section of the channel is reduced upward and downward (Fig. 2 B).

Regarding Claim 2, Sato et al disclose the microchip wherein the gap is formed by protruding parts (Fig. 1-2).

Regarding Claim 6, Sato et al disclose a microchip wherein the microchannel is constricted for concentrating and/or capturing the bead (Fig. 2).

Regarding Claim 7, Sato et al disclose the microchip wherein the inner surface of the microchannel is treated with casine (§ 2.6).

6. Claims 1-2, 6-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Quate et al (U.S. Patent No. 7,294,503, published 15 May 2002).

Regarding Claim 1, Quate et al disclose a microchip having a microchannel formed by grooved connecting surfaces of upper and lower substrate (Example 1), wherein the microchannel is provided with a gap in which a section of the channel is reduced upward and downward i.e. channel cross-section narrows to permit single particle flow (Fig. 6 & 14, 18, Column 7, lines 14-16, 56-57 and Column 17, line 15-Column 18, line 40).

Regarding Claim 2, Quate et al disclose the microchip wherein the gap is formed by protruding parts (Fig. 1-2).

Regarding Claim 6, Quate et al disclose a microchip wherein the microchannel is constricted for concentrating and/or analysis of the bead (Fig. 6 & 16, Column 7, lines 14-16, 56-57 and Column 17, line 15-Column 18, line 40).

Regarding Claim 7, Quate et al disclose the microchip wherein the inner surface of the microchannel is treated (Column 19, line 9-41).

7. Claims 1-4, 6-7 are rejected under 35 U.S.C. 102(e) as being anticipated by Zenhausern et al (U.S. Patent Application Publication No. 2004/0011650, filed 22 July 2002).

Regarding Claim 1, Zenhausern et al disclose a microchip having a microchannel formed by grooved connecting surfaces of upper and lower substrate (§ 48), wherein the microchannel is provided with a gap in which a section of the channel is reduced upward and downward (Fig. 1, § 47-48 and § 60, two-sided constriction and/or gradually narrows to constriction area).

Regarding Claim 2, Zenhausern et al disclose the microchip wherein the gap is formed by protruding parts (Fig. 1 and 5, § 60 and § 255).

Regarding Claim 3, Zenhausern et al disclose the microchip wherein the gap is formed by opposed protruding parts (Fig. 1, ¶ 60).

Regarding Claim 4, Zenhausern et al disclose the microchip wherein the channel has protruding parts within the channels (Fig. 1) wherein the channels are formed by bonding upper and lower substrate (¶ 48 and ¶ 60). Hence, the protrusion formed in one substrate is within the channel structure of the other substrate.

Regarding Claim 6, Zenhausern et al disclose a microchip wherein the microchannel is constricted for concentrating and/or capturing the sample at the constriction wherein the sample is immobilized on a bead (¶ 108, ¶ 270-271, Fig. 2).

Regarding Claim 7, Zenhausern et al disclose the microchip wherein the inner surface of the microchannel is treated with biocompatible materials to prevent non-specific binding (¶ 49-50).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zenhausern et al (U.S. Patent Application Publication No. 2004/0011650, filed 22 July 2002) in view of Lough et al (U.S. Patent No. 5,900,481, issued 4 May 1999).

Regarding Claims 8-12, Zenhausern et al disclose a microchip having a microchannel formed by grooved connecting surfaces of upper and lower substrate (¶ 48), wherein the microchannel is provided with a gap in which a section of the channel is reduced upward and

downward (Fig. 1, ¶ 47-48 and ¶ 60, two-sided constriction and/or gradually narrows to constriction area). Zenhausern et al teach the method of extracting nucleic acids wherein the nucleic acid is absorbed onto the surface as required by Claim 12 (¶ 108)

Zenhausern et al further teach the channels are constricted to capture nucleic acid-immobilized on beads for analysis wherein the channel diameter is less than 10µm (¶ 47, 252) but they do not specifically teach the bead diameter or hydroxyl functional groups for nucleic acid attachment. However, silica particles of less than 10µm having hydroxyl functional groups were well known and routinely practiced in the art at the time the claimed invention was made as taught by Lough et al.

Lough et al teach silica microbeads having a preferred size of less than 10µm (Column 3, lines 13-15, 25-26) and hydroxyl functional groups (Fig.2) wherein the surface is treated with a silane coupling agent (Fig. 2, Columns 3-4) whereby the nucleic acids for detecting are absorbed onto the surface of the beads (Abstract). Lough et al further teach the functionalization of the beads and surfaces provides differential immobilization chemistry between the bead-surface-nucleic acids (Abstract).

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the bead and surface functionality of Lough et al to the particles of Zenhausern. One of ordinary skill in the art would have been motivated to do so based on the preferred differential immobilization of Lough (Abstract).

9. Claims 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zenhausern et al (U.S. Patent Application Publication No. 2004/0011650, filed 22 July 2002) in view of Smith et al (U.S. Patent No. 6,270,970, issued 7 August 2001) and Lough et al (U.S. Patent No. 5,900,481, issued 4 May 1999).

Regarding Claims 8-12, Zenhausern et al disclose a microchip having a microchannel formed by grooved connecting surfaces of upper and lower substrate (§ 48), wherein the microchannel is provided with a gap in which a section of the channel is reduced upward and downward (Fig. 1, § 47-48 and § 60, two-sided constriction and/or gradually narrows to constriction area). Zenhausern et al teach the method of extracting nucleic acids wherein the nucleic acid is absorbed onto the surface as required by Claim 12 (§ 108)

Zenhausern et al further teach the channels are constricted to capture nucleic acid-immobilized on beads for analysis wherein the channel diameter is less than 10µm (§ 47, 252) but they do not specifically teach the bead diameter or hydroxyl functional groups for nucleic acid attachment. However, silica particles of less than 10µm having hydroxyl functional groups were well known and routinely practiced in the art at the time the claimed invention was made as taught by Lough et al.

Smith et al teach silica microbeads having a preferred size of less than 10µm (Column 12, lines 16-32) and immobilization-specific functional groups (Column 14, lines 45-56) wherein the surface is treated with a silane coupling agent (Column 14, line 57-Column 15, line 12) whereby the nucleic acids for detecting are selectively absorbed onto and released from the surface of the beads based on the presence and/or concentration of chaotropic salts (Column 16, line 58-Column 17, line 25) whereby the salts provide the nucleic acids in an unfolded state (Column 10, lines 43-57).

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the chaotropic salts of Smith et al to the hybridization methods of Zenhausern and Lough. One of ordinary skill in the art would have been motivated to do so for the expected benefit of providing unfolded nucleic acids that are more thermodynamically stable than folded nucleic acids to thereby favor hybrid formation (Smith et al, Column 10, lines 43-57).

Conclusion

10. No claim is allowed.
11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BJ Forman whose telephone number is (571) 272-0741. The examiner can normally be reached on 6:00 TO 3:30.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla can be reached on (571) 272-0735. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

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For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.


BJ Forman, Ph.D.
Primary Examiner
Art Unit: 1634
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